

Design Optimization

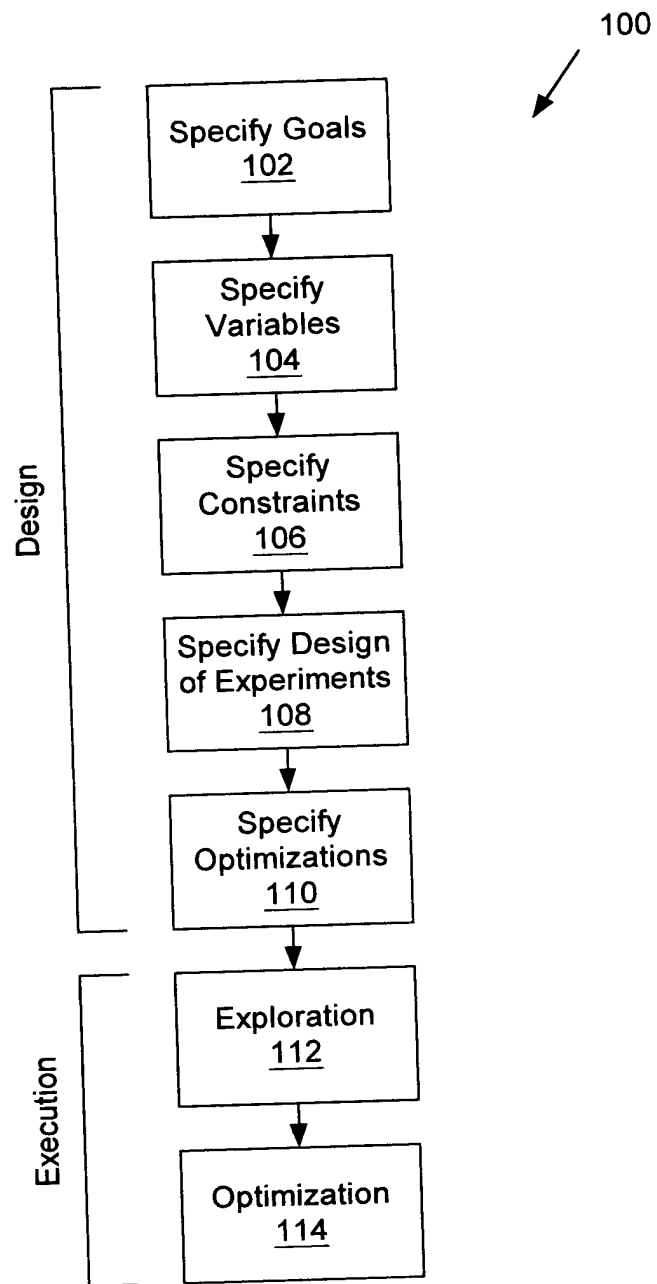


Figure 1 / 27

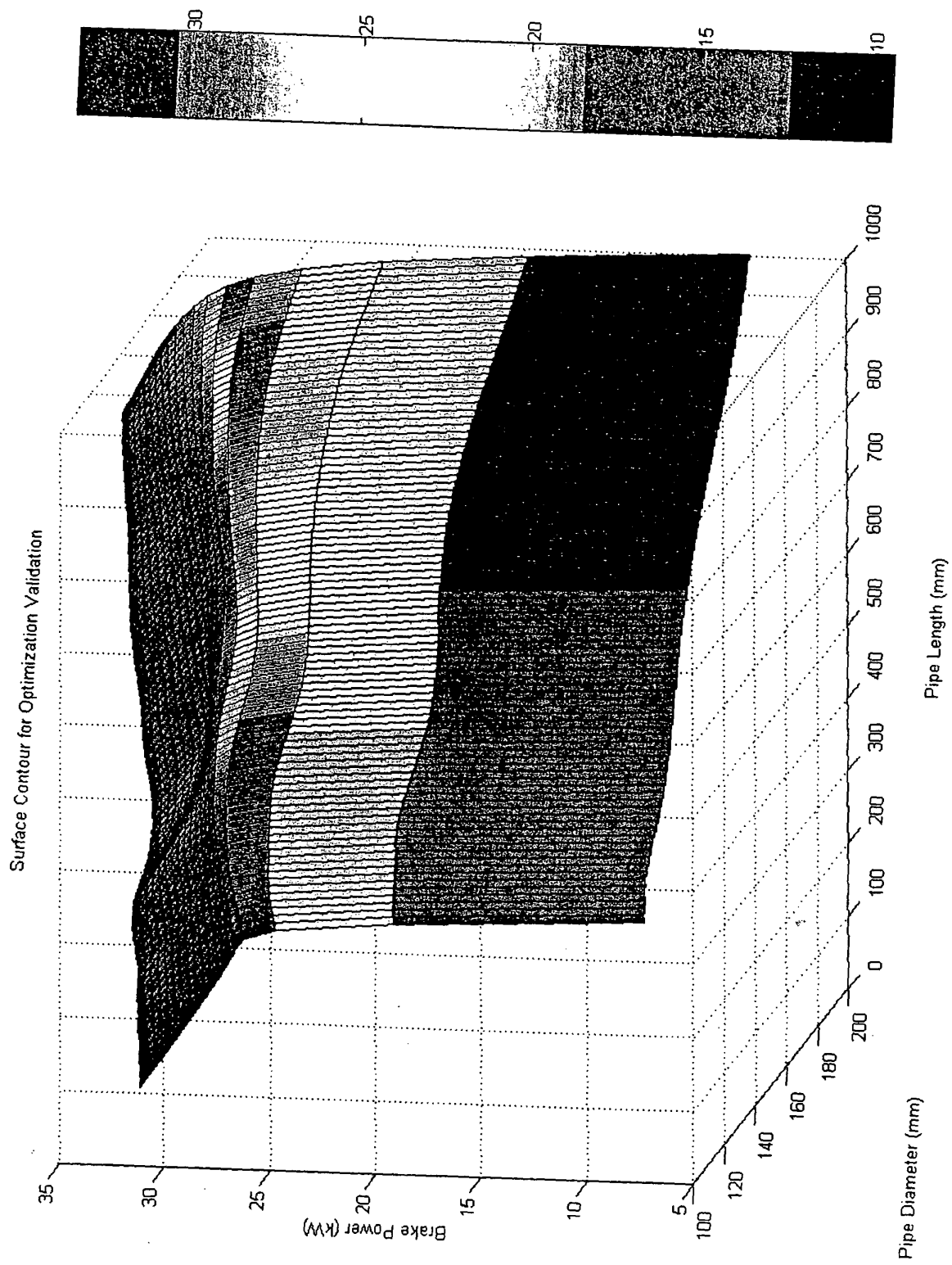


Figure 2

Exploration Value
Determination

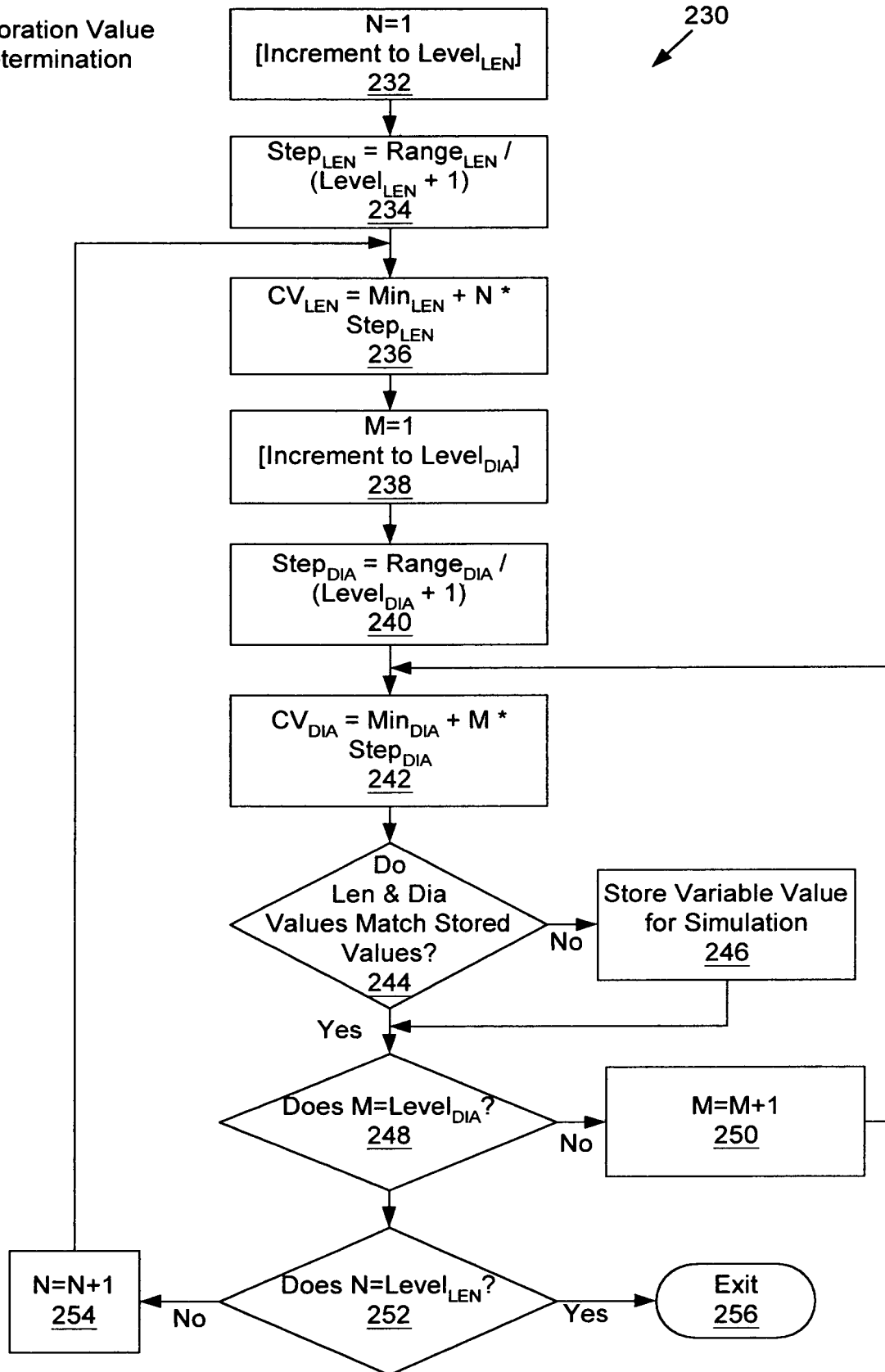


Figure 3 / 27

Tolerance Method

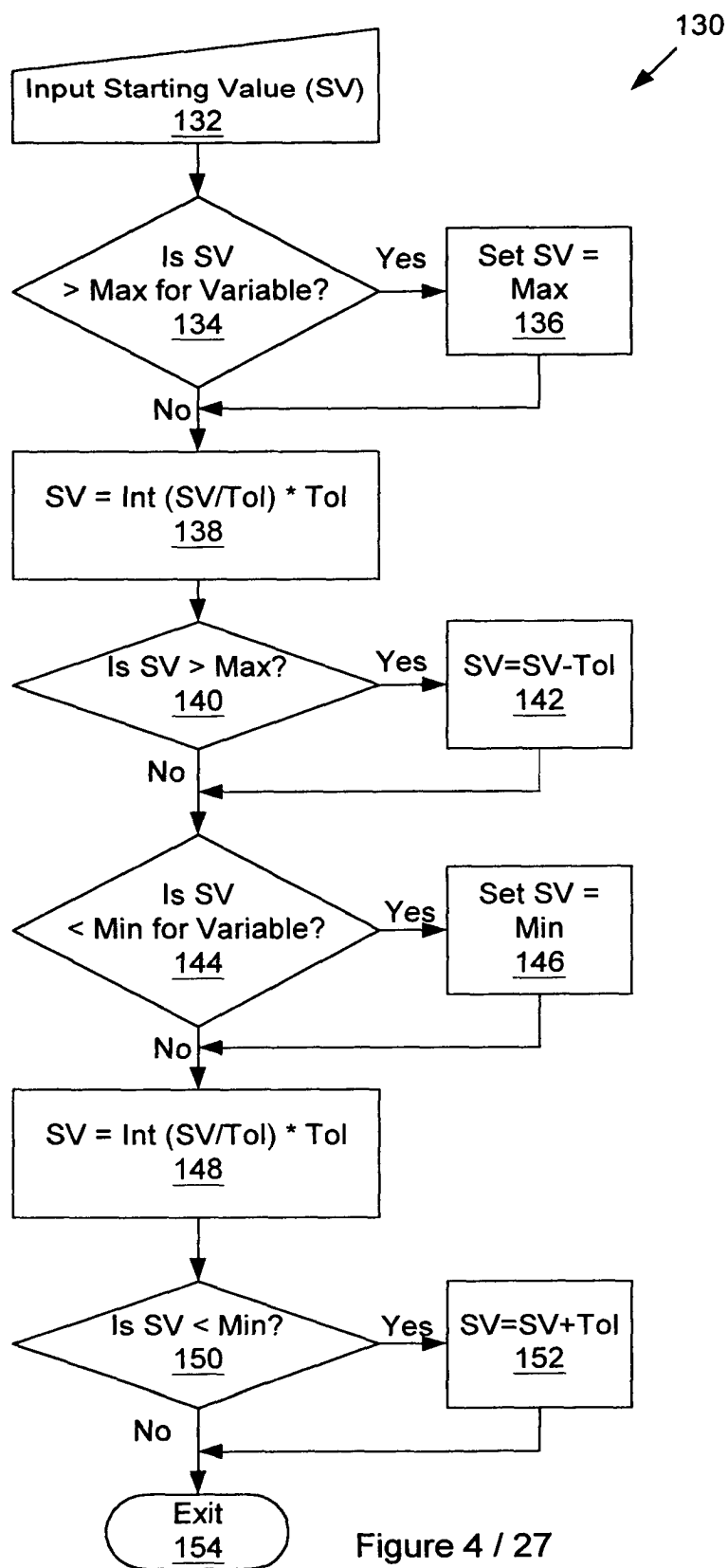


Figure 4 / 27

Exploration

112 →

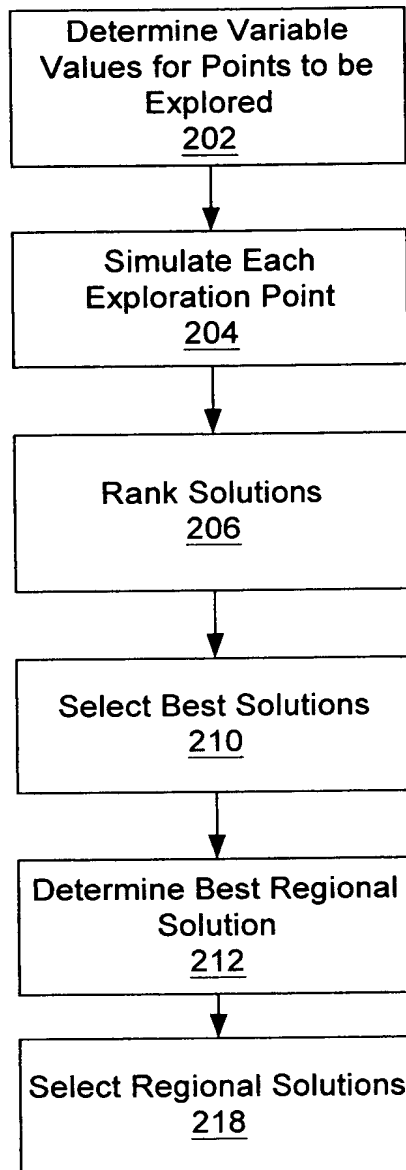


Figure 5 / 27

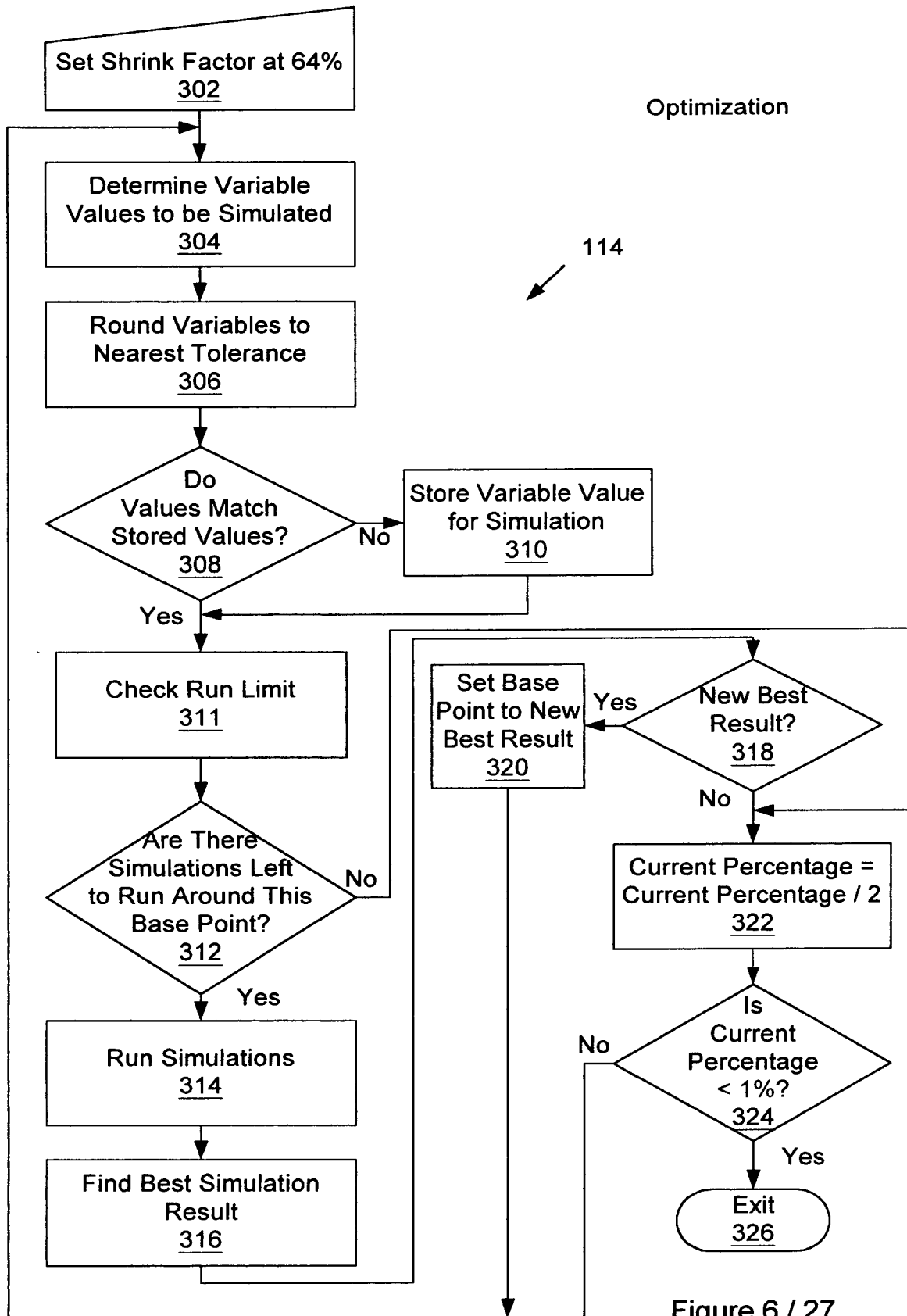


Figure 6 / 27

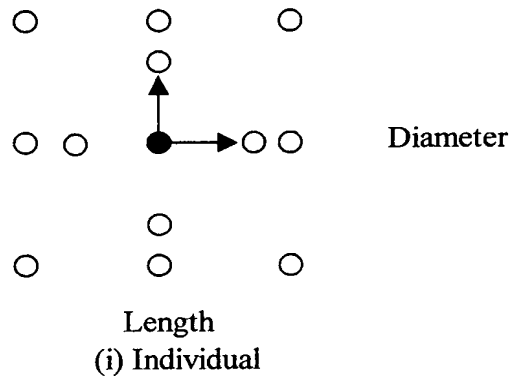


Figure 7a / 27

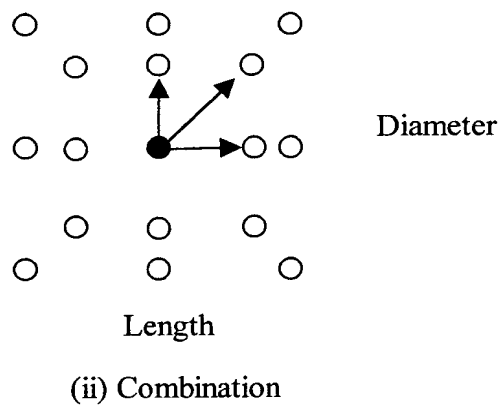


Figure 7b / 27

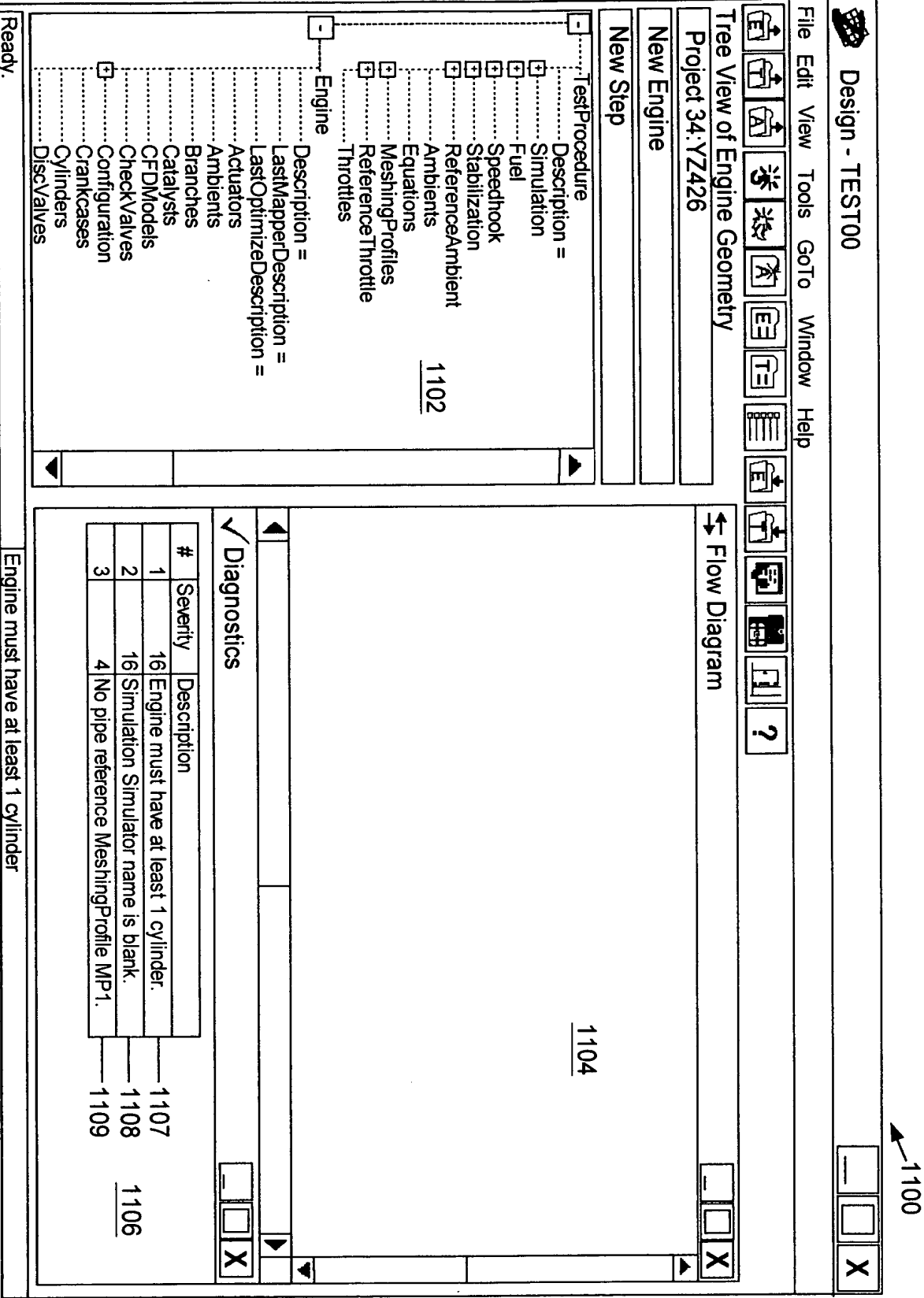


Figure 8 / 27

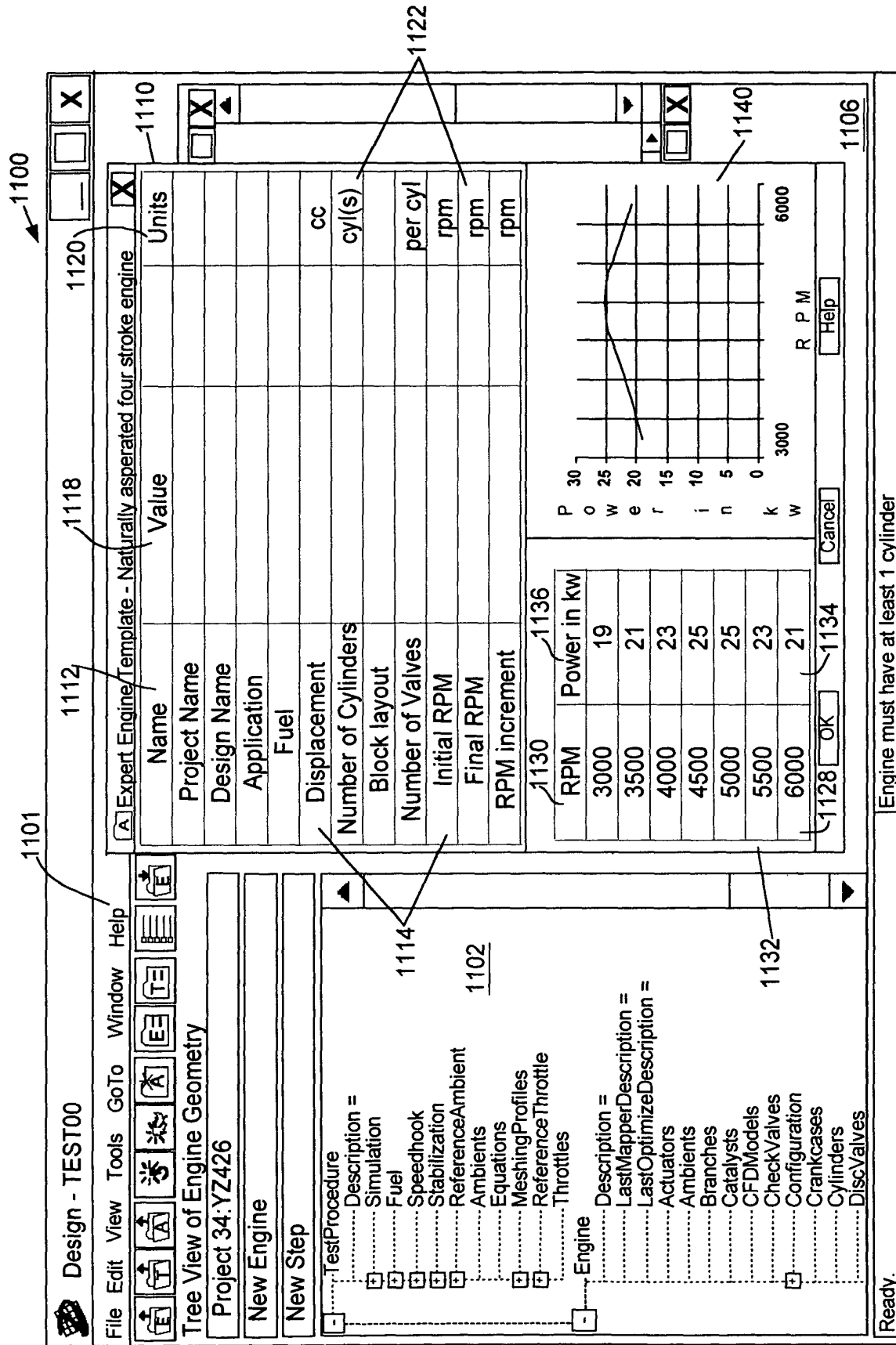


Figure 9 / 27

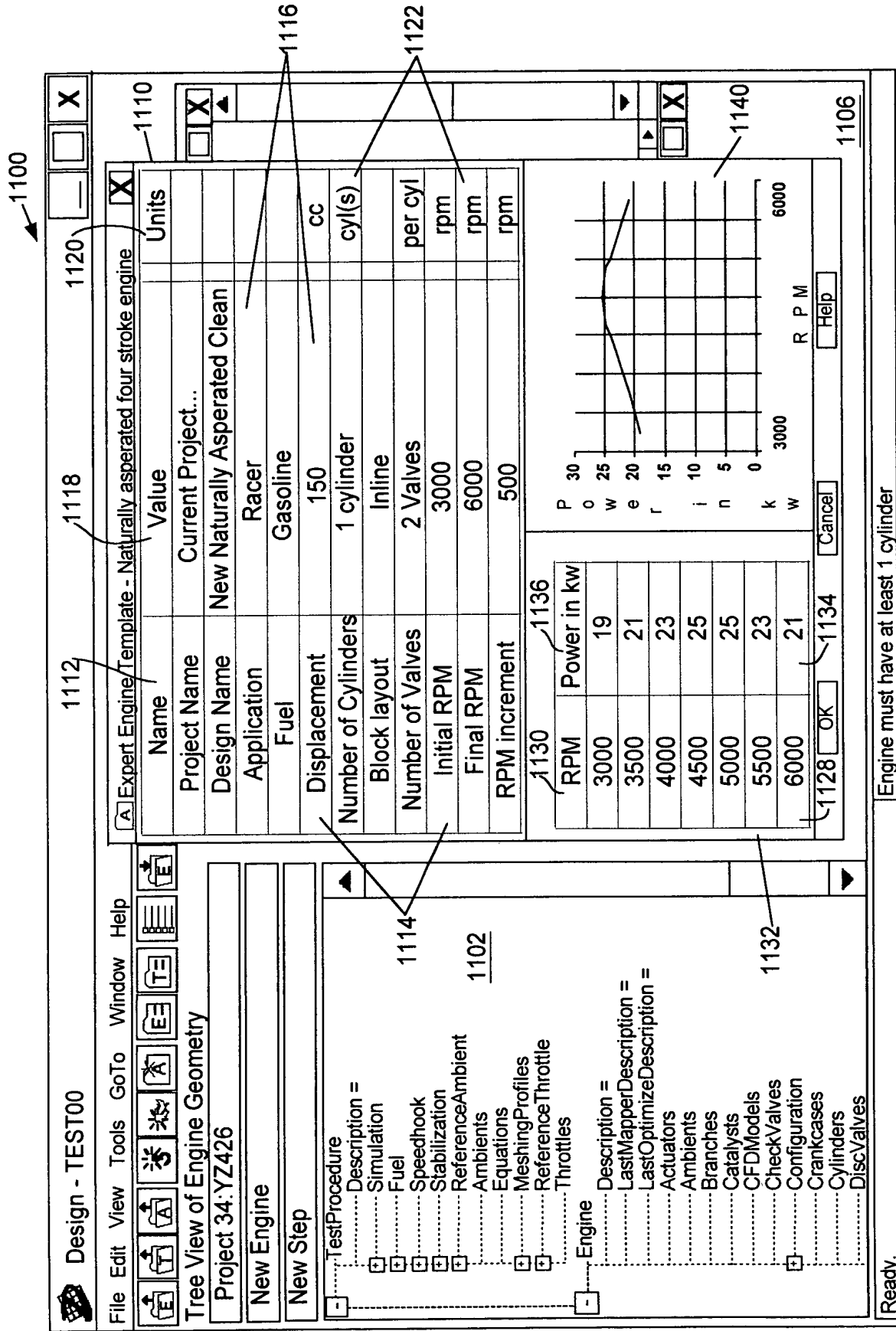


Figure 10 / 27

1100

Design - TEST00

File Edit View Tools GoTo Window Help

Tree View of Engine Geometry

Project 273: ReValidation

AutomatedEngineDesign 398: New Experimental Engine

AutomatedEngineDesign

Description = New Experimental Engine

Objective

Strategy

SymbolicComponents

Engine

Description = New Experimental Engine

LastMapperDescription =

LastOptimizeDescription =

Actuators

Ambients

Branches

Catalysts

CFDModels

CheckValves

Configuration

Crankcases

Cylinders

DiscValves

Ends

Equations

Intercoolers

Manifolds

Model

Pipes

Plenums

PoppetValveSystems

Flow Diagram

1150 INTATM

1152 INTPLN

1154 INP1

1156 THR1

1158 INP2

1160 INV1

1162 CYL1

1164 EXV1

1166 EXP1

1168 EXHATM

1104

✓ Diagnostics

#	Severity	Description
1	4	Specification(1): Pipe EXP1 discontinuity detected between sections 3 and 4.
2	4	Specification(1): Pipe INP1 discontinuity detected between sections 3 and 4.
3	4	Specification(1): Ambient INTATM values not found in TestProcedure, Using Refer
4	4	Specification(1): Ambient EXHATM values not found in TestProcedure, Using Refer

Specification(1): Pipe EXP1 discontinuity detected between sections 3 and 4.

Figure 11 / 27

1100

Design - TEST00

File Edit View Tools GoTo Window Help

Tree View of Engine Geometry

Project 273: ReValid ☆ AutomatedEngineDesign.Objective.Specification(1)

AutomatedEngineDes

AutomatedEng

Description =

Objective

Description

Specification

Specification

Goal

Test

Strategy

Description

Explore

Explore

Explore

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Random

Explore

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SaveE

Startin

Ending

Global

Global

Equatio

Variable

SymbolicCon

Engine

Goals Speedhook Stabilization Simulation Fuel

Available Goals:

1201

BMEP

BSCO

BSFC

BSHC

BSNO

ChargingEfficiency

DeliveryRatio

FMEP

IMEP

PeakPressure

PeakPressureAngle

Peak Temperature

PMEP

BrakePower

ScavengingEfficiency

TrappingEfficiency

Add

Delete

Edit

Close

Selected Goal:

Maximize BrakePower

1204

1200

1204

1106

Ready.

Specification(1): Pipe EXP1 discontinuity detected between sections 3 and 4.

Figure 12 / 27

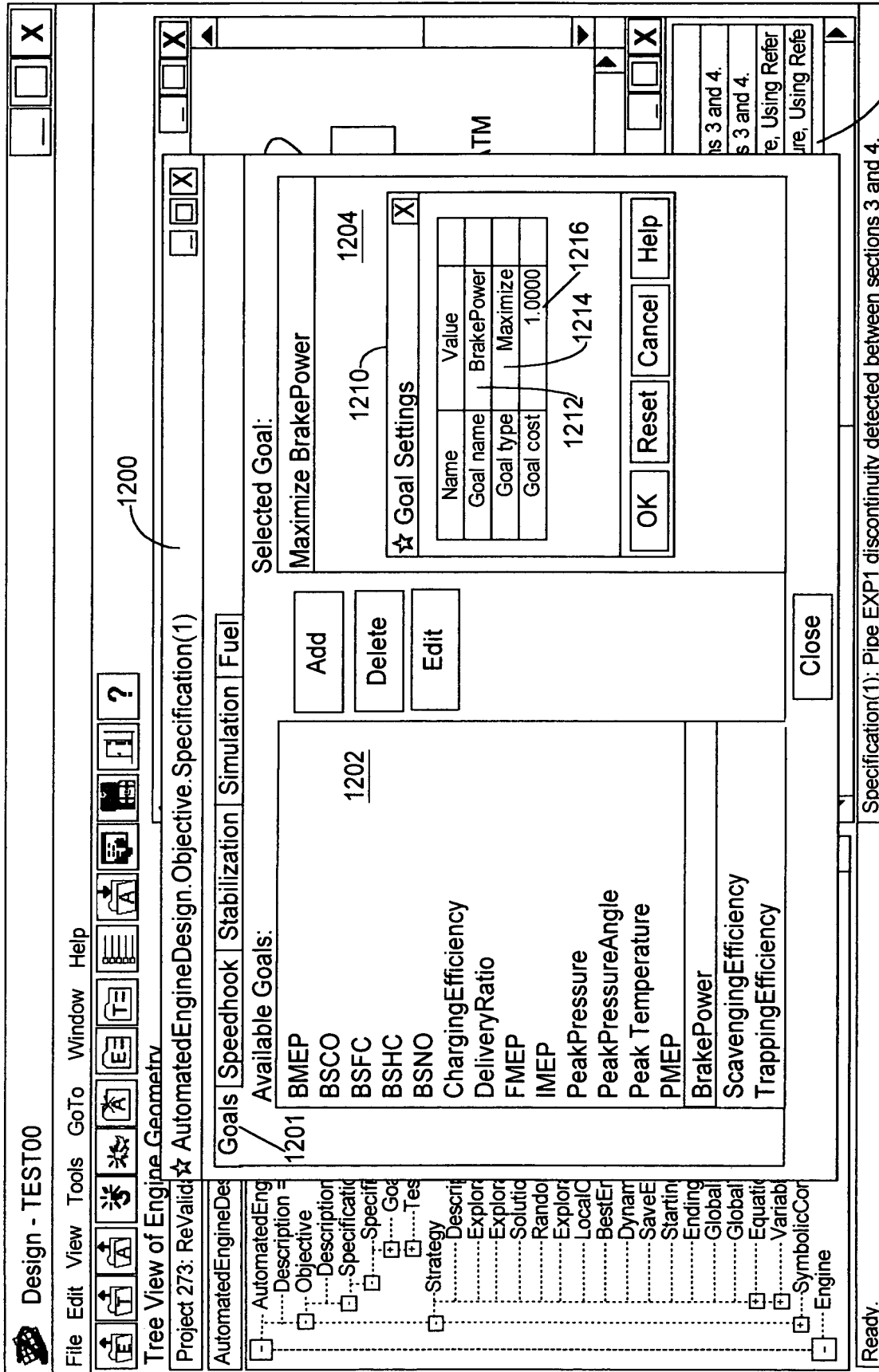


Figure 13 / 27

1100

Design - TEST00

File Edit View Tools GoTo Window Help

Tree View of Engine Geometry

Project 273: ReValidation

AutomatedEngineDesign 398: New Experimental Engine

AutomatedEngineDesign

Description = New Experimental Engine 1102

Objective

Description = New Experimental Engine

Specification

Specification

Goals

TestP

Strategy

Descriptive

Explorative

Explorative

SolutionL

RandomS

Explorative

LocalOpt

BestEngin

Dynamic

SaveExp

StartingD

EndingDe

GlobalDe

GlobalTo

Equations

Variables

SymbolicComp

Engine

Flow Diagram

1200

1150

1152

1154

1156

1158

EXP2

EXHATM 1168

Goals Speedhook Stabilization Simulation Fuel

Dimensions 1220 1222

Name	Type	Value	Step	Units
Start RPM		5000		
End RPM		11000		
RPM increment		1000		
Cycles at step		5		

1224 1226 1228 1230

Close

Ready.

Specification(1): Pipe EXP1 discontinuity detected between sections 3 and 4.

1106

Figure 14 / 27

1100

Design - TEST00

File Edit View Tools GoTo Window Help

Tree View of Engine Geometry
 Project 273: ReValidation

AutomatedEngineDesign 398: New Experimental Engine
 1102

AutomatedEngineDesign
 Description = New Experimental Engine
 Objective
 Description = New Experimental Engine
 Specification
 Specification
 Goals
 TestProcedure
 Strategy
 Description
 Exploration
 Exploration
 SolutionLi
 RandomS
 Exploration
 LocalOptim
 BestEngin
 DynamicC
 SaveExpl
 StartingDe
 EndingDe
 GlobalDel
 GlobalTol
 Equations
 Variables
 SymbolicComp
 Engine

AutomatedEngineDesign.Objective.Specification(1)
 Goals Speedhook Stabilization Simulation Fuel

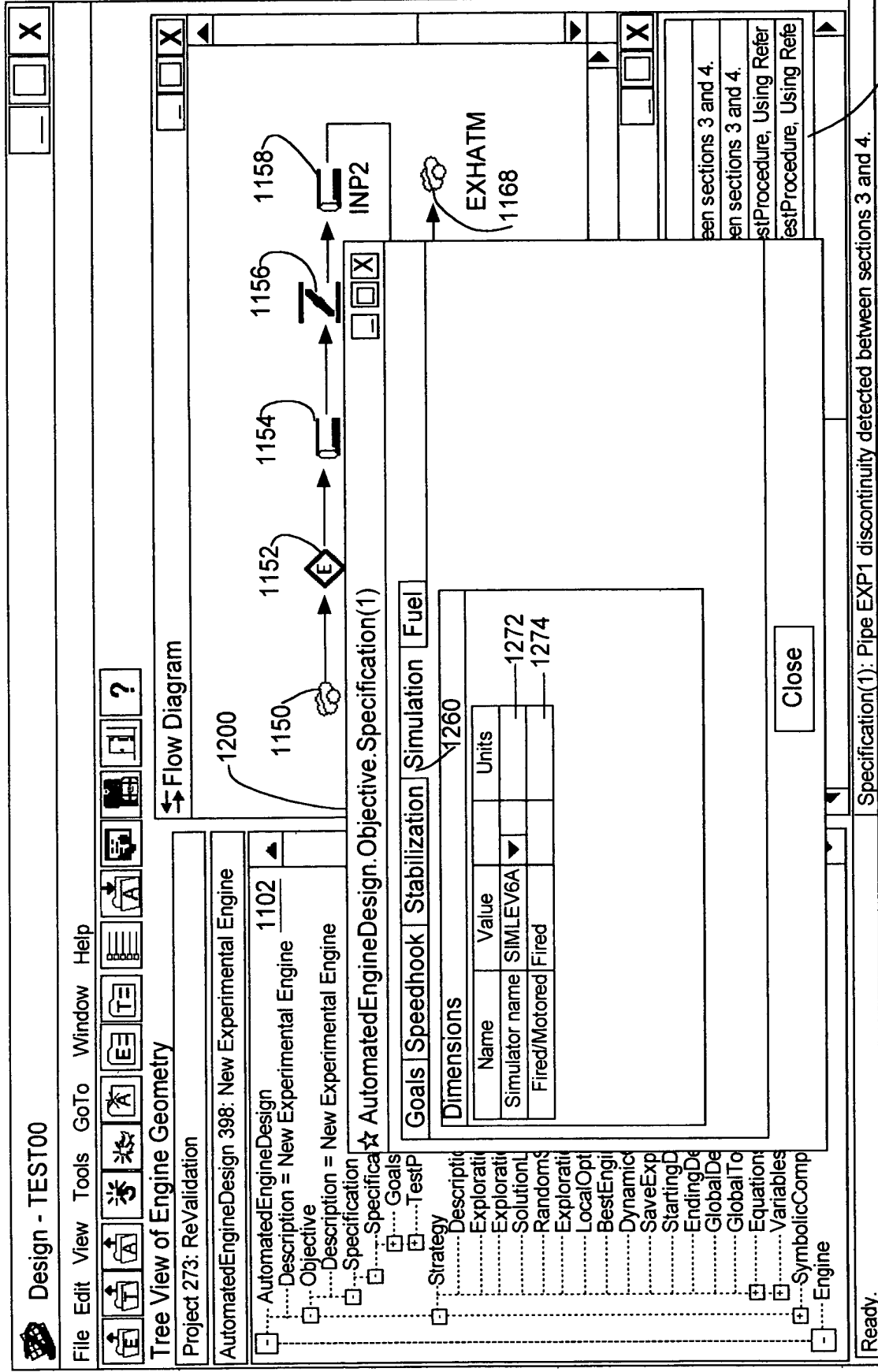
Dimensions

Name	Value	Units
Difference	0.01	atm
Long slope	0.01	
Long Count	10	Cycles
Short slope	0.01	
Short count	5	Cycles
Maximum revolutions	99	Cycles
Stabilization value	BMEP	

Close

Specification(1): Pipe EXP1 discontinuity detected between sections 3 and 4.

Figure 15 / 27



7106

1100

Design - TEST00

File Edit View Tools GoTo Window Help

Tree View of Engine Geometry

Project 273: ReValidation

AutomatedEngineDesign 398: New Experimental Engine

AutomatedEngineDesign

Objective

Description = New Experimental Engine

Specification

Specification

Goals

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Strategy

Description

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GlobalDel

GlobalTol

Equations

Variables

SymbolicComp

Engine

Flow Diagram

1200

1150

1152

1154

1156

1158

INP2

EXHATM

1168

Goals Speedhook Stabilization Simulation Fuel

Dimensions

Name	Value	Units
Fuel	Gasoline	
Oxygen-carbon ratio	0.00000	
Hydrogen-carbon ratio	1.95	
Calorific fuel value	43500000	J/kg
Heat of vaporization	420000	J/kg

Close

Ready.

Specification(1): Pipe EXP1 discontinuity detected between sections 3 and 4.

1106

Figure 17 / 27

1100

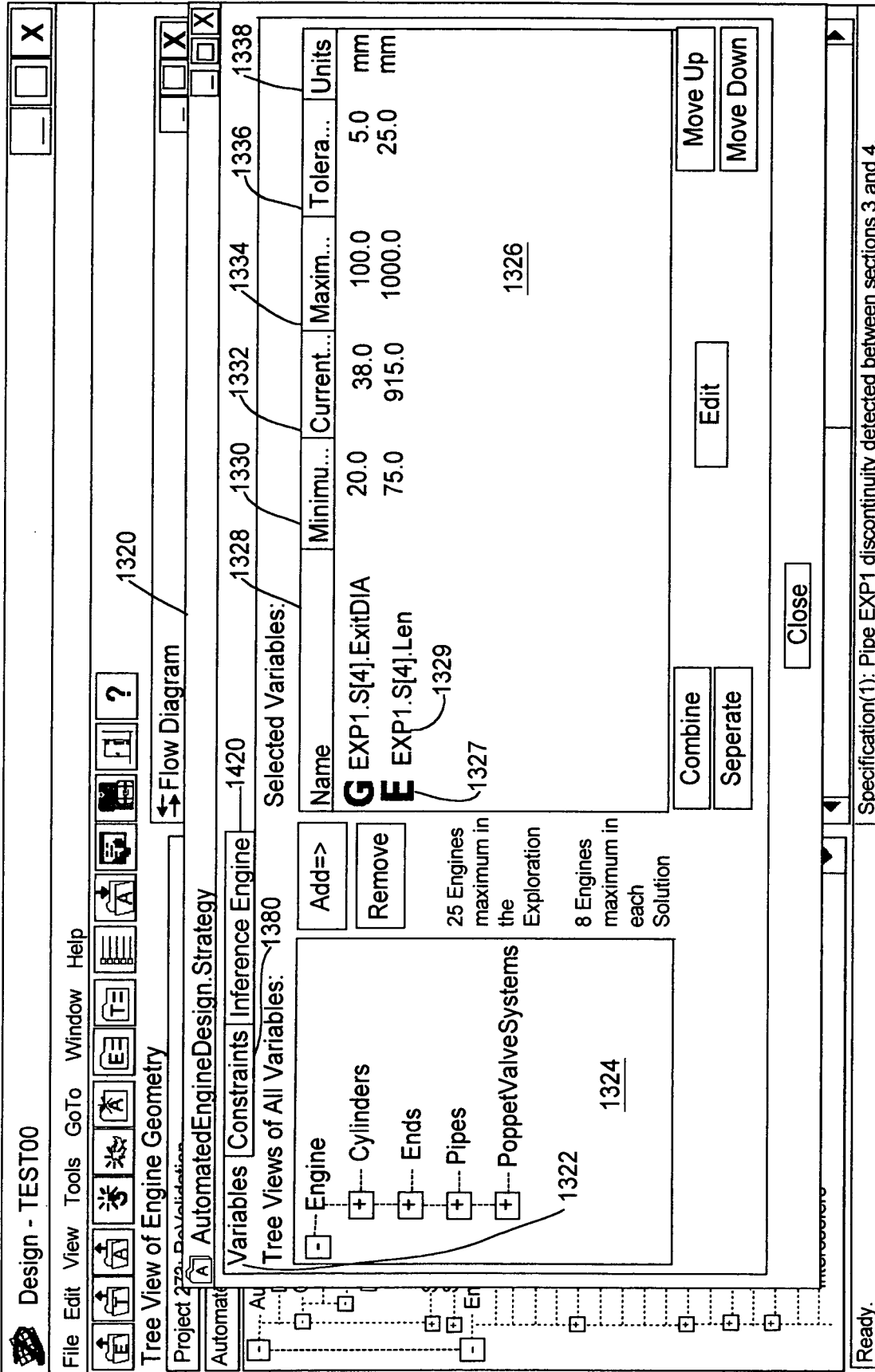


Figure 18 / 27

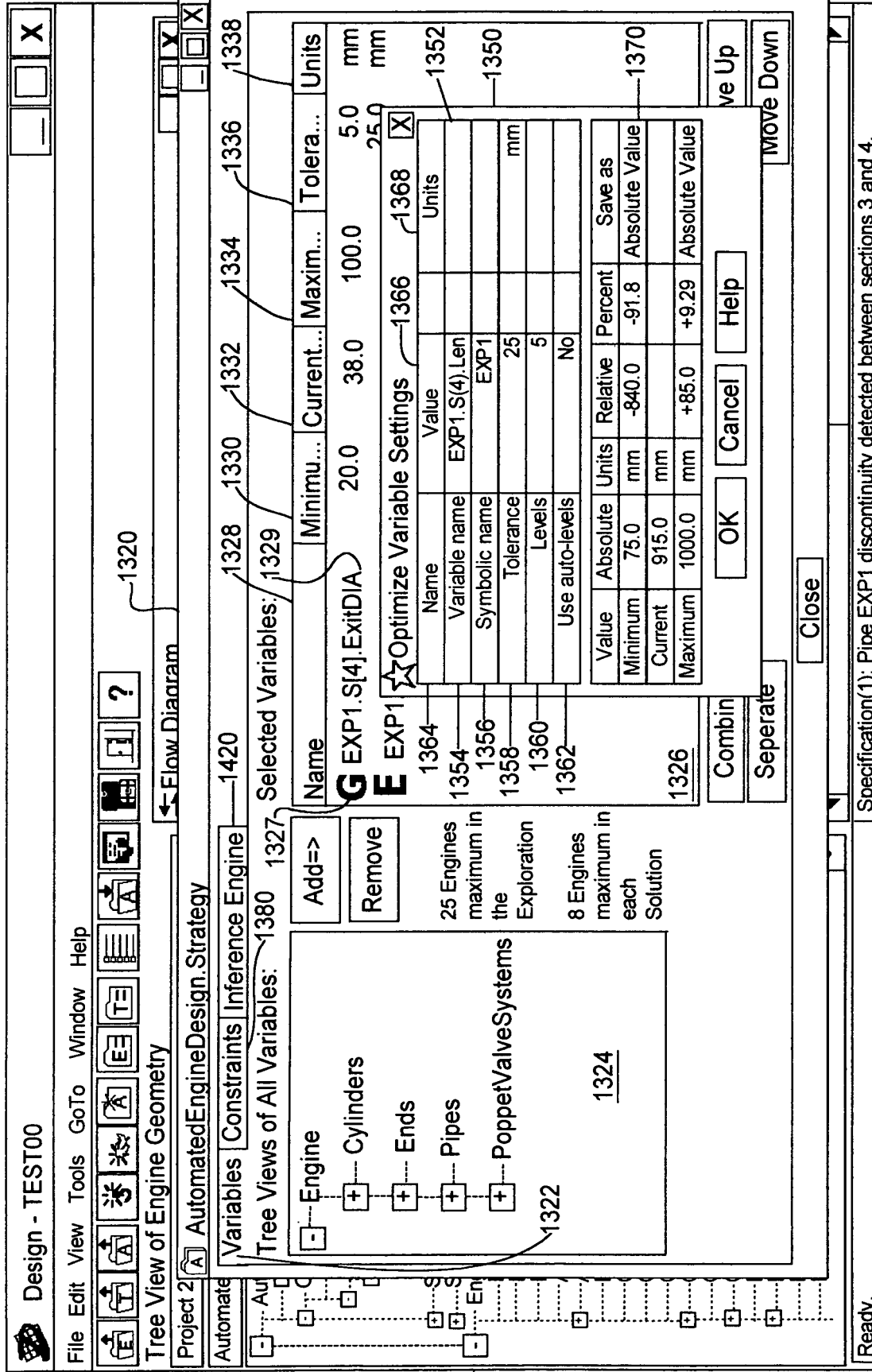


Figure 19 / 27

1100

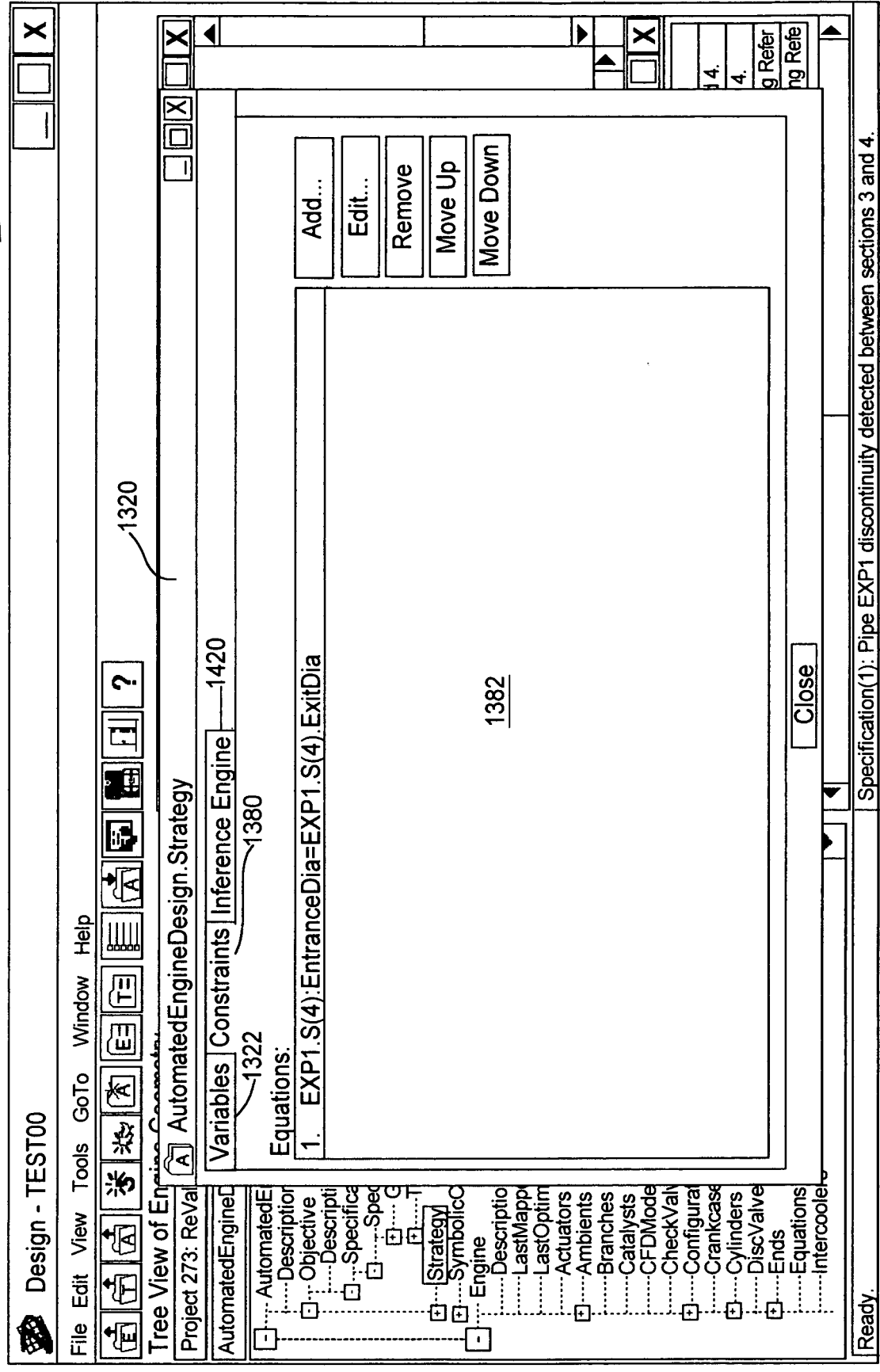


Figure 20 / 27

1100

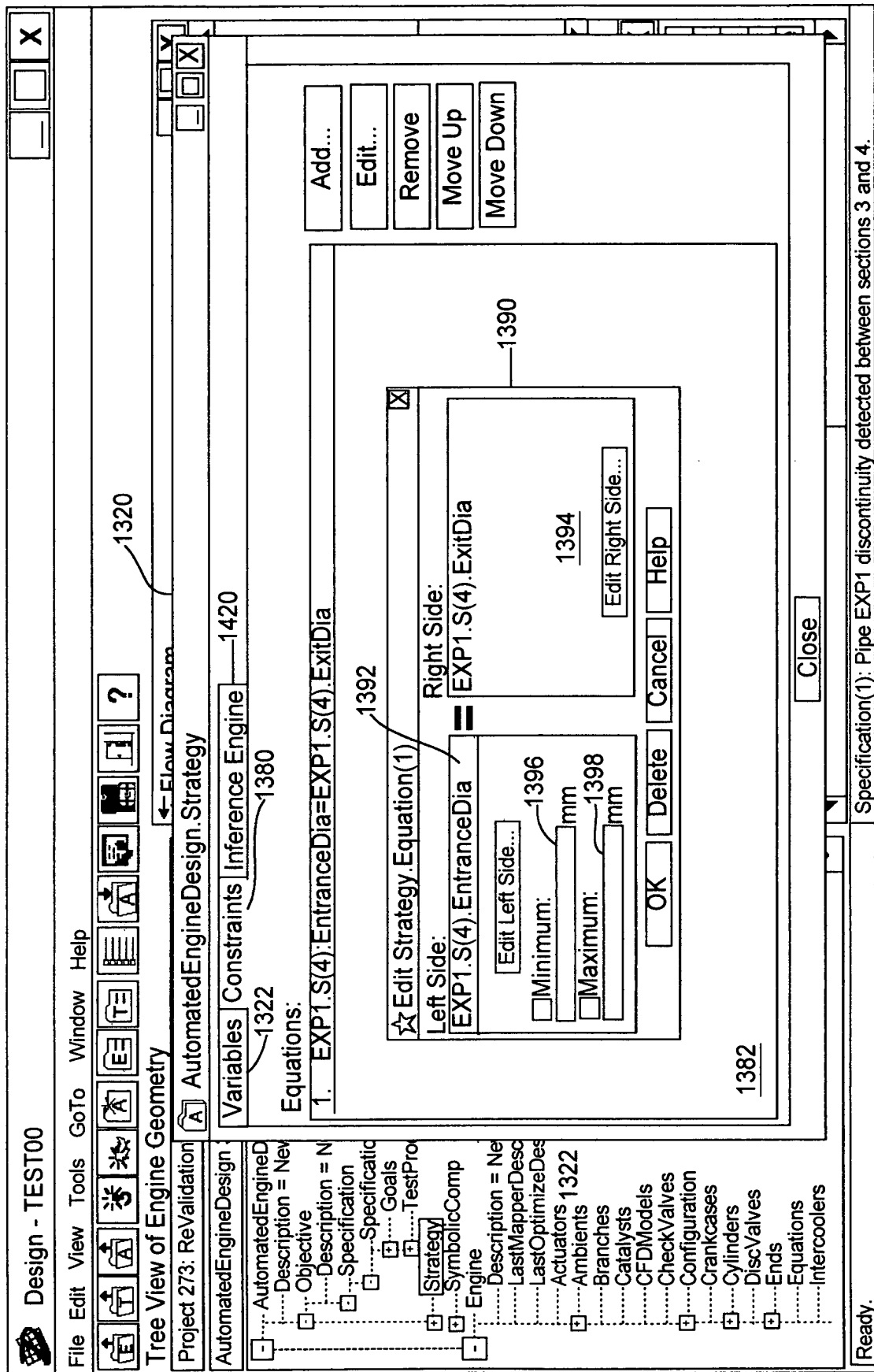


Figure 21 / 27

1100

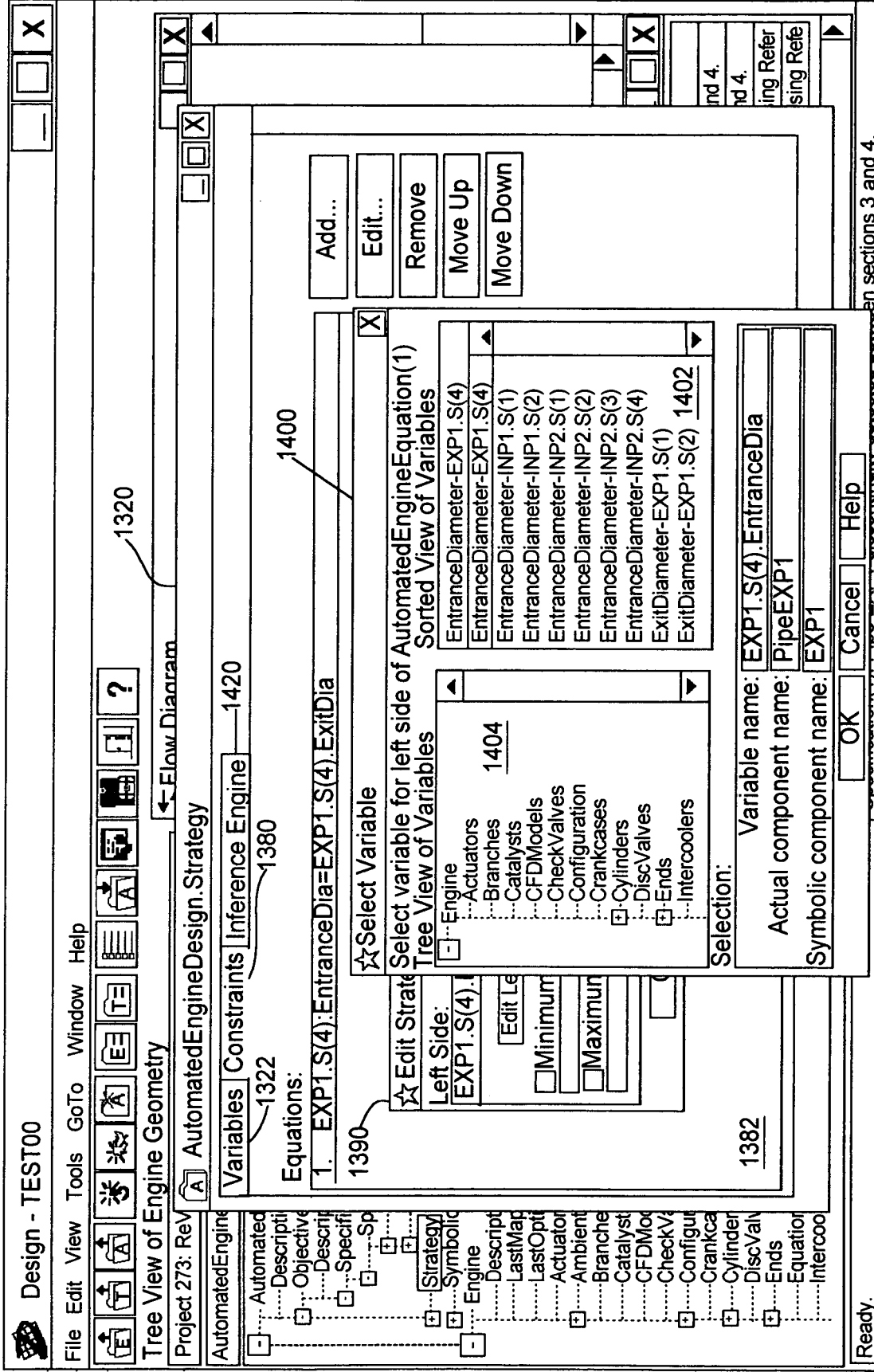


Figure 22 / 27

1100

Design - T A AutomatedEngineDesign.Strategy

File Edit View

Tree View of En

Project 273: ReVal

AutomatedEngineC

AutomatedEI

Objective

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Spec

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Strategy

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Engine

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LastMapp

LastOptim

Actuators

Ambients

Branches

Catalysts

CFDMode

CheckVail

Configurat

Crankcase

Cylinders

DiscValve

Ends

Equations

Intercoole

Variables

Constraints

Inference Engine

1420

1426

1430

1428

1432

1434

1436

1438

1440

1442

1454

1456

1458

1452

1450

1484

1480

1482

1486

1488

Close

Name	Value	Units
Exploration	Yes	
Maximum engines in exploration	128	
Total solutions	6	
Maximum engines in each solution pass	132	
Monte Carlo seed starting value	0	
Advanced Options	Yes	

Name	Value	Units
Exploration process	Inside Matrix	
Local optimum solutions	5	
Extra best engines solutions	1	
Second exploration for each solution	Yes	
Dynamic combinations	No	
Save exploration results	No	
Save solution results	No	
Generate calibration table	No	
Starting percent	50.00	%
Ending percent	1.00	%

Name	Value	Units
Default min/max delta value	0.5000	
Default min/max delta description	times current value	
Default tolerance value	10.0000	
Default tolerance description	times current variable tolerance	

Figure 23 / 27

←1100

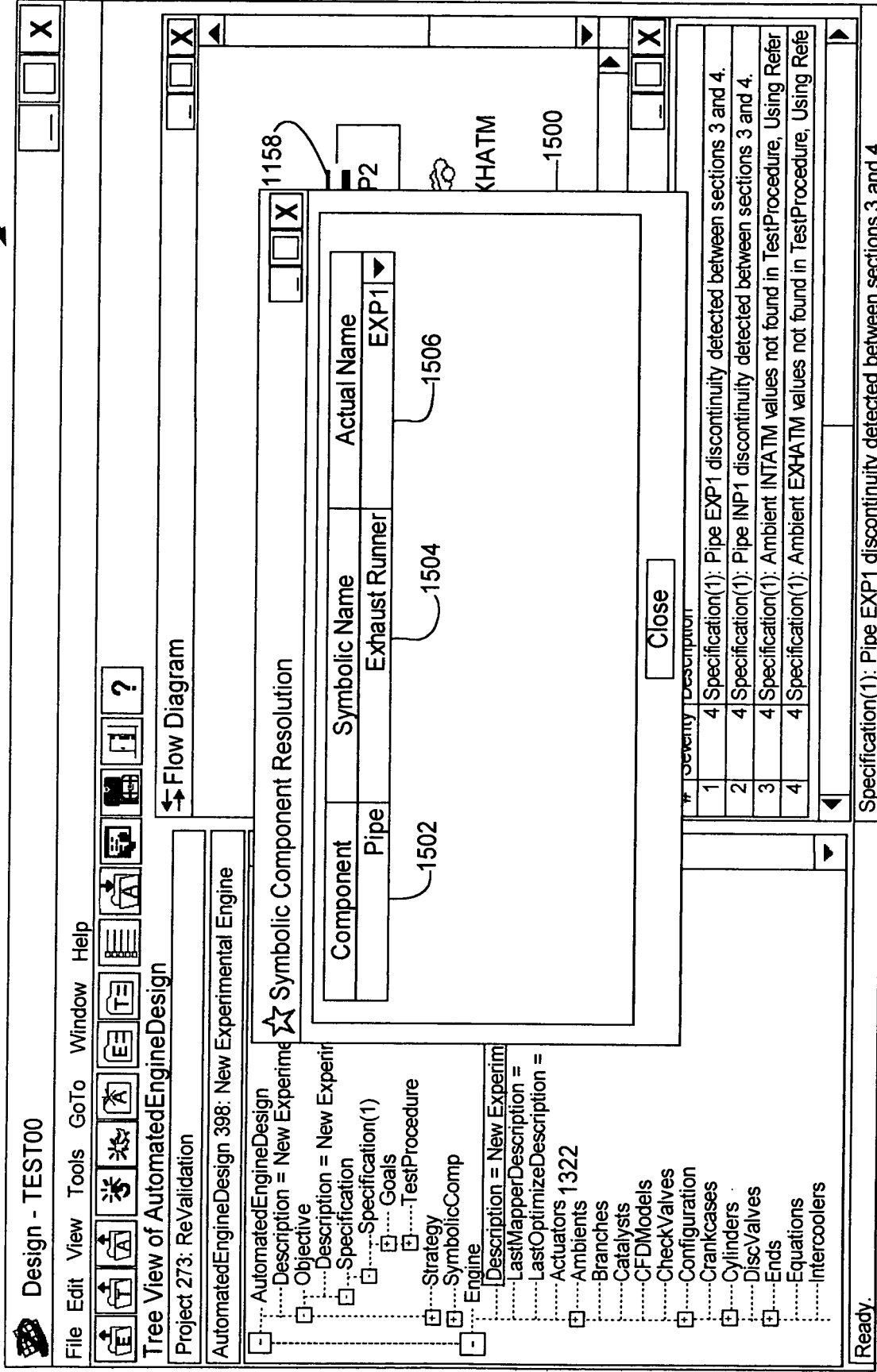


Figure 24 / 27

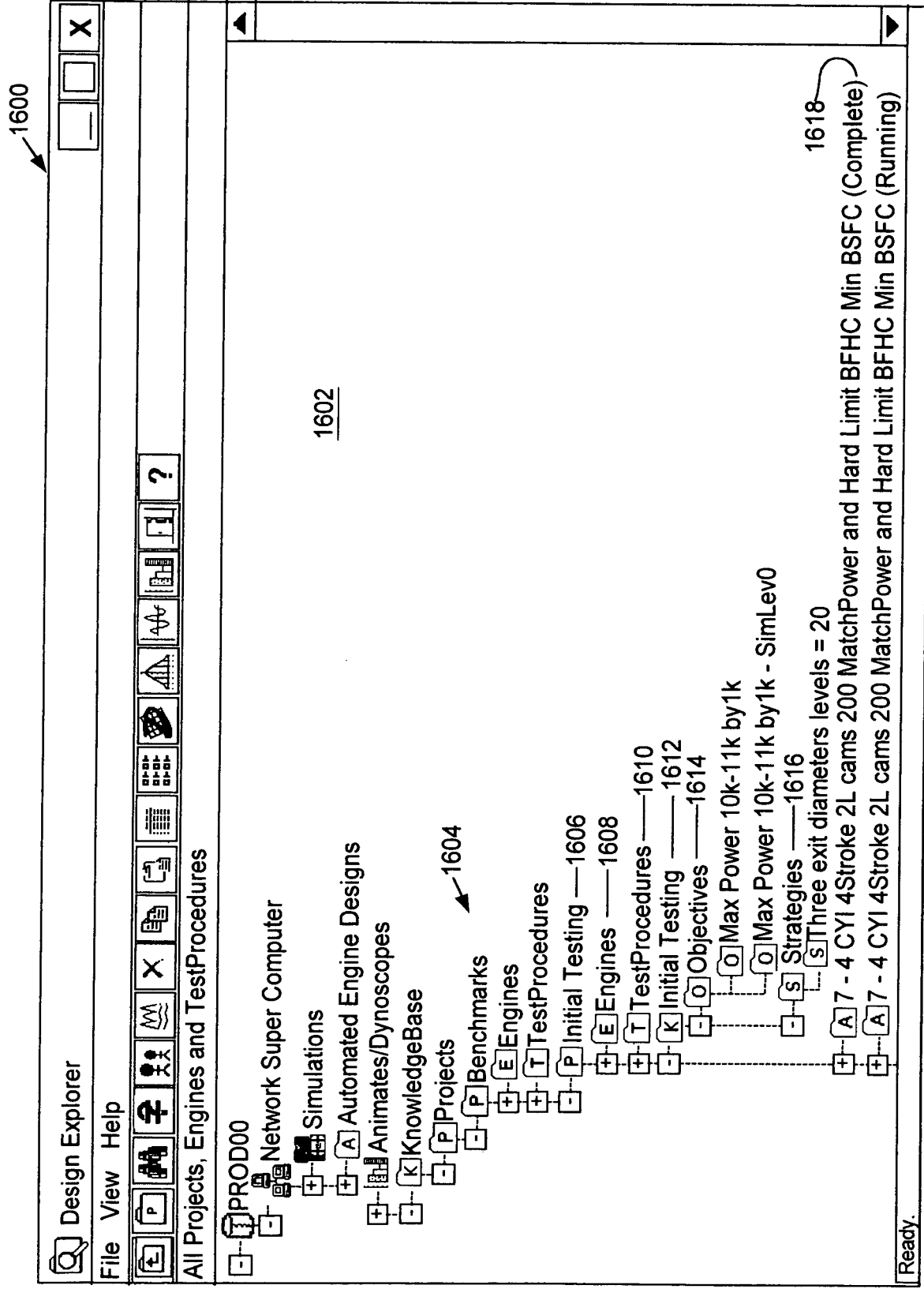


Figure 25 / 27

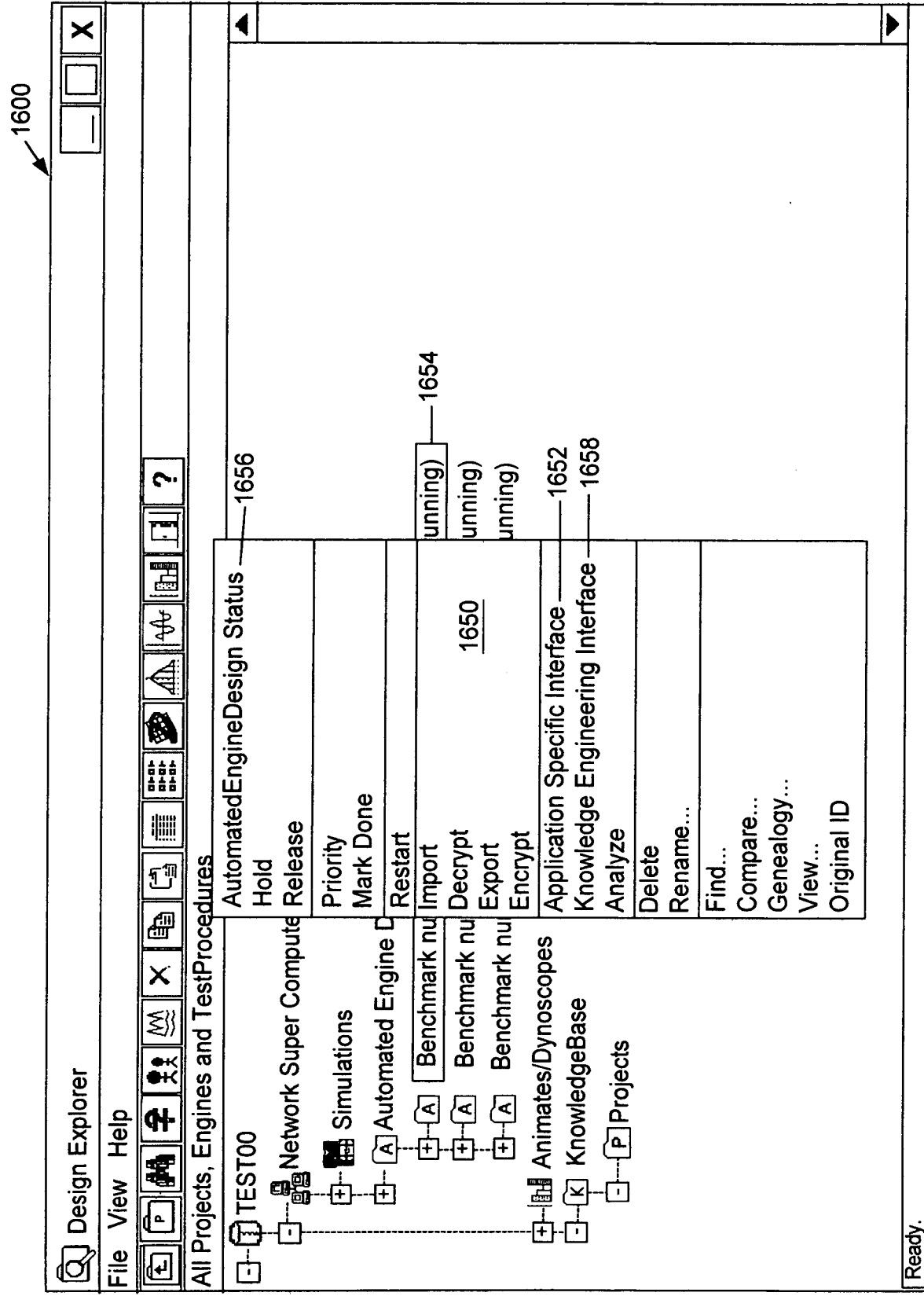


Figure 26 / 27

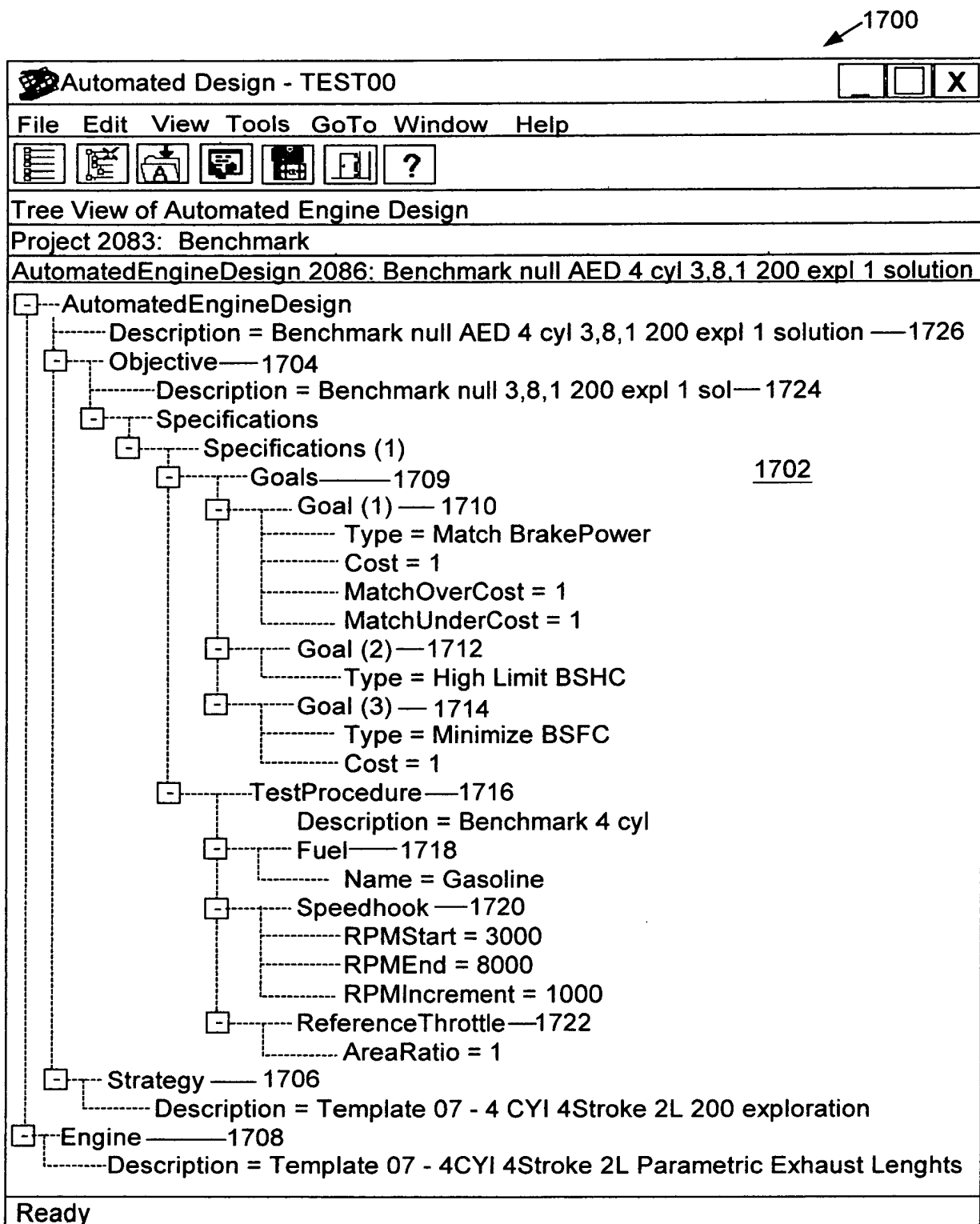


Figure 27 / 27